The Philippine Statistician, 2006
Vol. 55, Nos. 3-4, pp. 43-53

Some Aspects of the Teaching of Statistics in the Philippines

Ana Maria L. Tabunda[1]

ABSTRACT

This paper provides a profile of faculty teaching statistics courses at the tertiary level in the country. The overall picture that emerges is dismal. Only about 5% of those teaching at least one statistics course have a degree in statistics, while only about 13% of those teaching predominantly statistics subjects possess a statistics degree. Use of a more liberal standard for assessing preparedness to teach statistics – that of merely requiring that the faculty had taken the corresponding course s/he is teaching – still results in about 40% who cannot be presumed to possess the appropriate background. Moreover, a sizeable percentage (30%) teaches on a part-time basis, with more of those teaching the advanced statistics courses (40%) doing so.

I. INTRODUCTION

This paper primarily seeks to provide a profile of the faculty teaching tertiary level statistics courses in the country. The main sources of information of the study are: (i) a 2001 survey by the Commission on Higher Education (CHED) on Higher Education Institutions (HEIs); and (ii) a 2003 survey conducted by the UP Statistical Center Research Foundation, Inc. (UPSCRFI) on units within HEIs that were offering Science and Technology (S&T) courses.

A main limitation of this paper is the quality of the data on which it is based. Both surveys had sizeable non-response rates: 24.8% and 42.4% for the CHED and UPSCRFI surveys, respectively[2]. In particular, four large universities with sizeable enrollment in S&T did not respond to the CHED survey: the De La Salle University (DLSU) based in Manila, the Polytechnic University of the Philippines (PUP), the University of the Philippines (except for UP Visayas) and the University of Santo Tomas (UST).

Nevertheless the 2001 CHED survey remains an invaluable source of information on tertiary level education, as it required the HEIs to list the subjects taught by each faculty member in the first semester of AY 2001-2002, a requirement that may have, in effect, contributed to non-response as well as rendered analysis of the data more difficult.[3] This additional information on subjects taught by the faculty, together with the academic preparation of the faculty, afforded some insights into the quality of S&T teaching, one of the research interests covered in the UPSCRFI study.

---

[1] Professor, School of Statistics, UP Diliman, Quezon city. Email Address: altabunda@yahoo.com ana_maria.tabunda@up.edu.ph

[2] The 2001 CHED survey was intended to be a census. Some 1,202 out of the 1,598 HEIS (including satellites) in 2001 responded to the CHED survey. Some 1,395 units out of a targeted sample of 2,424 units within HEIs that were offering S&T courses responded to the UPSCRFI survey. See Tabunda (2007) for more details on these two surveys.

[3] CHED subsequently revised its reporting form on faculty loading which no longer required a list of courses taught by individual faculty. Official CHED figures on academic preparation of faculty are available beginning AY 2002-2003.

This paper focuses more on the scope and quality of statistics instruction in the country as compared to the UPSCRFI survey. The UPSCRFI survey on S&T teaching manpower requirements categorized S&T faculty according to subject *predominantly* taught so as to avoid double counting faculty who taught courses in more than one discipline (Tabunda, 2007). Its focus was thus on teaching manpower by main discipline. The study presents information not only on faculty who primarily teach statistics courses, but also on faculty who primarily handle courses belonging to other disciplines but also teach at least one statistics course.

II. NUMBER OF INSTITUTIONS OFFERING STATISTICS COURSES

The teaching of statistics in the country has been proceeding at a rapid pace, with more institutions offering courses and degree programs in statistics as computing technology becomes more accessible, thereby further fueling demand for statistical skills in the workplace. A 1972 UNESCO study on the teaching of statistics in developing countries, which was undertaken by the International Statistical Institute, lists only two universities in the country that were offering "programmes or courses leading to a qualification in statistics" - the Ateneo de Manila University (ADMU) and the University of the Philippines (UP). UP submitted a consolidated report on the number of teaching staff and degree offerings of the statistics units in Diliman and Los Baños, as well as of the Population Institute in Diliman. The UNESCO study reports that there were six personnel teaching statistics at ADMU (4 full-time, 2 part-time for a full-time equivalent of 5) and 42 in UP (34 full-time and 8 part-time) in 1972.

Today there are at least 19 HEIs offering degree programs in statistics (Bersales, 2007) and at least 471 other institutions offering courses in statistics at the tertiary level (Table 1).[4] Despite the increase in statistics course offerings, only about 40% of HEIs offering other S&T courses likewise have statistics course offerings. The percentages are particularly low (below 30%) in Region 10, the Autonomous Region of Muslim Mindanao (ARMM) and Caraga.

III. A PROFILE OF FACULTY TEACHING STATISTICS COURSES

Only a little over 5% of the 1,073 faculty teaching statistics in the 484 HEIs that responded to the 2001 CHED survey have a degree in statistics (Table 2). This is not surprising; it simply underscores the fact that there is an acute shortage of statisticians in the country.

A slightly better profile, in terms of academic degrees, was obtained for the 414 faculty tagged as teaching *predominantly* statistics courses in an earlier study (Tabunda, 2007). About 12.8% had degrees in statistics with 7% at the bachelor's level, 4.8% at the master's level and 1% at the Ph.D. Level. But this is likely to be an overestimate of the true proportion obtaining in the country, as the 2001 CHED 2001 survey data was supplemented by 2003 UPSCRFI survey data as well as data from internet websites of known S&T

[4] The figures in Table 1 include 5 institutions known to be offering degree programs in statistics but did not respond to the 2001 CHED survey.

departments and units. But no counterpart effort could be made to locate, outside of the 2001 CHED survey, much less establish the educational attainment of, faculty teaching predominantly statistics courses but not necessarily belonging to statistics units.

To help determine whether the faculty teaching statistics courses had at least some background in the course s/he was teaching, the courses were first categorized into two levels: basic or introductory and advanced. Any course covering material beyond descriptive statistics and introductory level inferential statistics (i.e., the level in such introductory texts as Walpole) was considered advanced. Thus a single course on probability or a single course on inferential statistics was categorized as advanced. But courses labeled as 'Probability and Statistics', for example, were classified as introductory, as in-depth coverage of either topic cannot be done in a single course. Also labeled as introductory were 'Statistics for' courses, e.g., 'Statistics for Biology', 'Statistics for Social Science'. Bio-statistics was also categorized as an introductory course, as its scope is that of one.

Courses other than probability and inferential statistics that were categorized as advanced include: Bayesian statistics, econometrics, experimental designs, multivariate methods, nonparametric statistics, regression, quality control, sampling, statistical programming and time series analysis. Courses listed as 'Advanced Statistics' were also categorized as advanced.

Table 1. Number of HEIs Offering Statistics Courses, by Region

Region	Number of HEIs Offering S&T courses (1)	Number of HEIs Offering		Total Number Offering Statistics Courses (4)	% HEIs with S&T courses (5) = (4)/(1)
		Only Basic Stat Courses (2)	Basic & Higher Stat Courses (3)		
Philippines	**1,169**	**432**	**57**	**489**	**41.8**
Region 1	73	32	1	33	45.2
Region 2	68	23	2	25	36.8
Region 3	139	49	4	53	38.1
Region 4	108	51	7	58	53.7
Region 5	107	45	6	51	47.7
Region 6	73	23	2	25	34.2
Region 7	83	21	5	26	31.3
Region 8	61	26	2	28	45.9
Region 9	26	7	0	7	26.9
Region 10	43	14	2	16	37.2
Region 11	72	27	5	32	44.4
Region 12	45	19	1	20	44.4
NCR	185	70	16	86	46.5
CAR	36	16	3	19	52.8
ARMM	8	1	1	2	25
Caraga	42	8	0	8	19

Main source of basic data: CHED 2001 Survey on Faculty

Some of the courses listed contained only the course numbers (e.g., Stat II' or 'Stat 211') or the description or course title was vague (e.g., 'Methods of Research & Statistics', 'Statistical Analysis'). In such cases, only faculty who clearly are not qualified to teach any statistics course (e.g., degree is bachelor of arts and not in mathematics) were considered as not possessing the appropriate background for teaching the course. On the other hand, faculty

who had statistics degrees were considered as possessing the appropriate background to teach any statistics course. All other situations involving courses with vague descriptions were categorized as "unclassifiable".

The following conventions were then used in evaluating the academic preparedness of faculty for the statistics course they were handling. A faculty member with a bachelor's degree which requires at least one statistics course was considered to possess the appropriate background for teaching introductory statistics courses. Those whose highest degree is a bachelor of arts degree (unless it is in mathematics) or a bachelor's degree in education (which provides training for teaching only at the elementary and secondary levels) were considered as *not* possessing the appropriate background to teach introductory statistics. Those with bachelor's or master's degrees that do not necessarily require statistics courses but allow them as electives were categorized as possessing a background that was "unclassifiable". These include degree holders in architecture, chemistry, chemical engineering, geodetic engineering, and mechanical engineering. Thus one who possesses at least a bachelor's degree in science specializing in fields other than those listed in the unclassifiable category, or a bachelor of science degree in non-S&T disciplines such as business administration, economics and psychology, was considered qualified to teach an introductory statistics course.

Table 2. Academic Degrees in Statistics of S&T Faculty Teaching Statistics, AY 2001-2002, by Region*

Region	No. of Faculty	% With Bachelor's Degree in Statistics	% With Master's Degree in Statistics	% With Doctorate Degree in Statistics
Philippines	**1,073**	**2.2**	**2.8**	**0.4**
Region 1	79	0	0	0
Region 2	65	3.1	1.5	0
Region 3	102	0	2	0
Region 4	113	3.5	3.5	0.9
Region 5	88	4.5	1.1	0
Region 6	62	1.6	8.1	0
Region 7	54	0	0	0
Region 8	43	7	2.3	0
Region 9	11	0	0	0
Region 10	22	0	0	4.5
Region 11	63	7.9	1.6	0
Region 12	45	4.4	11.1	4.4
NCR	258	0.8	2.3	0
CAR	54	1.9	5.6	0
ARMM	2	0	50	0
Caraga	12	0	0	0

* no data from, among others, Batangas State University, DLSU, PUP, UST and UP campuses (except UP Visayas)
Source of raw data: CHED 2001 Survey of Faculty

With respect to the teaching of advanced statistics courses, degree holders in industrial engineering were considered qualified to teach statistical quality control, while degree holders in agricultural specializations such as agronomy, crop science and soil sciences were considered qualified to teach experimental designs. Those possessing master's

degrees in economics were considered qualified to teach econometrics. Finally, degree holders in statistics were considered qualified to teach all statistics courses.

The conventions used to assess the academic preparation of the faculty handling the courses may thus appear to be quite liberal. This is in cognizance of the fact that statistical methods are frequently developed for applications in other disciplines and then proceed to grow and develop in these disciplines, e.g., experimental designs in agriculture and quality control in engineering. Quality control, in fact, is generally acknowledged to have "developed almost on its own although it used to be part of statistics" (Lindley, 1984). As Lindley put it, we see " . . . biologists, engineers and geographers all write their own books on statistics and apply the results to their own disciplines. Provided they do not make errors, this is surely to be welcomed." The conventions used in this paper are thus premised on the hope that no errors are committed by those who have no degree in statistics but are teaching statistics courses.

The use of the above conventions in assessing the preparation of faculty teaching statistics courses indicates that nearly 60% of the faculty handling statistics courses have taken a course s/he is handling, whereas nearly 30% have not taken the course or were trained to teach at the elementary or secondary level (Table 3). Particularly problematic are Regions 2, 5, 8, 9, ARMM and Caraga, where at most only half of those teaching statistics have the appropriate academic background.

Table 3. Academic Preparation of S&T Faculty Teaching Statistics, AY 2001-2002, by Region*

Region	Number of Faculty	% With Appropriate Background	% With Unclassifiable Background	% Without Appropriate Background	% Non-response**
Philippines	**1,073**	**58.6**	**12.6**	**27.8**	**1**
Region 1	79	58.2	6.3	32.9	2.5
Region 2	65	46.2	16.9	36.9	0
Region 3	102	54.9	10.8	34.3	0
Region 4	113	59.3	18.6	22.1	0
Region 5	88	44.3	11.4	44.3	0
Region 6	62	51.6	16.1	32.3	0
Region 7	54	63	9.3	27.8	0
Region 8	43	44.2	9.3	44.2	2.3
Region 9	11	18.2	9.1	72.7	0
Region 10	22	72.7	18.2	9.1	0
Region 11	63	74.6	11.1	14.3	0
Region 12	45	73.3	6.7	20	0
NCR	258	65.5	11.6	19.8	3.1
CAR	54	61.1	11.1	27.8	0
ARMM	2	50	50	50	0
Caraga	12	41.7	50	2.4	0

* No data from, among others, Batangas State University, DLSU, PUP, UP (except UPV) and UST

** No indication of academic degrees

Source of raw data: CHED 2001 Survey of Faculty

About 91% of teachers handling statistics courses are teaching introductory statistics only (Table 4). Results further indicate that, on a national scale, those who teach the more advanced courses are no less likely to have the appropriate background as those teaching the

basic courses. Surprisingly though, NCR and Region 7 belong to the five regions with the lowest proportion of qualified teachers for advanced statistics courses. This could be a red flag signaling inordinate excess demand over supply, a situation that merits future investigation. Or this may be an artifact of large non-response.

Table 4. Academic Preparation of Faculty Teaching Statistics by Level and Region

Region	Total No. Teaching Statistics Courses**	Faculty Teaching			
		Only Basic Statistics		Higher and/or Basic Statistics	
		Number	% With Appropriate Background	Number	% With Appropriate Background
Philippines	**1,034**	**936**	**61.4**	**98**	**65.3**
Region 1	79	68	57.4	11	63.6
Region 2	52	47	49	5	80
Region 3	100	99	56.6	1	0
Region 4	111	105	60	6	66.7
Region 5	87	79	46.8	8	25
Region 6	61	56	57.1	5	40
Region 7	54	47	68.1	7	28.6
Region 8	42	40	45	2	50
Region 9	11	11	18.2	0	
Region 10	21	19	78.9	2	50
Region 11	62	53	77.4	9	67
Region 12	38	32	71.9	6	100
NCR	251	221	71	30	33.3
CAR	51	46	67.4	5	40
ARMM	2	1	100	1	0
Caraga	12	12	41.7	0	

* No data from, among others, Batangas State University, DLSU, PUP, UP (except UPV) and UST

** Excluding courses categorized as unclassifiable

Source of raw data: CHED 2001 Survey of Faculty

Below are some examples of the highest degree in a quantitative field possessed by faculty evaluated to have inadequate background for the advanced statistics course s/he taught in 2001. If the faculty has no degree in a quantitative field, the highest degree obtained is listed (Table 5).

It is possible, although unlikely, that the faculty members concerned took an elective in statistics in the course or courses they were handling. However, the courses taught would have required the faculty to have taken at least six units of statistics, which very few students do, unless required. Alternatively, the faculty may have covered topics s/he has taken a course in, but the title of the course taught suggests a wider scope of topics (e.g., 'Statistics in Research') or a deeper treatment of the subject matter (e.g., 'Inferential Statistics') than the statistics courses required in degree programs in other disciplines.

Table 5. Examples of Academic Preparation Categorized as Inadequate for Faculty Teaching Advanced Statistics Courses

COURSE LISTED	ACADEMIC DEGREE
Advanced Statistics	MA in Education
	Doctor of Education
Advanced Psychological Statistics	MA in Education major in Guidance and Counseling
Experimental Design	Master of Arts in Teaching (MAT) Mathematics
Inferential Statistics	BSBAA and Bachelor of Laws
	BS Civil Engineering with Masters in Education
	MBA
Introduction to Sampling Design	Doctor of Public Administration
Introduction to Linear Regression Analysis	MA in Mathematics Education
Introduction to Time Series Analysis	MA in Mathematics Education
Quality Control and Statistics	BS Chemistry with MAT in Biology
	BS Commerce
Statistics in Research	Ph.D. Physics

Another insight afforded by the 2001 CHED data on faculty academic preparation is that fewer of those teaching the more advanced statistics courses teach on a full-time basis (61%) compared to those teaching basic statistics courses (72%). [See Table 6.] NCR again joins the regions with a lower percentage of full-time faculty teaching advanced courses.

Table 6. Working Status (Full Fime/Part Time) of Faculty Teaching Statistics By Level and Region

Region	Total No. Teaching Statistics Courses**	Faculty Teaching					
		Only Basic Statistics		Higher and/or Basic Statistics		Courses Not Classifiable	
		Number	% Full Time	Number	% Full Time	Number	% Full Time
Philippines	**1,073**	**936**	**72.3**	**98**	**61.2**	**41**	**92.6**
Region 1	79	68	85.3	11	63.6	0	
Region 2	65	47	80.9	5	80	13	92.3
Region 3	102	99	69.7	1	0	2	50
Region 4	113	105	66.7	6	83.3	4	100
Region 5	88	79	62	8	37.5	1	100
Region 6	62	56	78.6	5	40	1	100
Region 7	54	47	76.6	7	57.1	0	
Region 8	43	40	90	2	50	1	100
Region 9	11	11	72.7	0		0	
Region 10	22	19	57.9	2	50	1	100
Region 11	63	53	71.7	9	67	1	100
Region 12	45	32	81.3	6	83	7	88
NCR	258	221	66.5	30	53.3	7	100
CAR	54	46	89.1	5	100	3	100
ARMM	2	1	100	1	100	0	
Caraga	12	12	66.7	0		0	

* No data from, among others, Batangas State University, DLSU, PUP, UP (except UPV) and UST
Source of raw data: CHED 2001 Survey of Faculty

Moreover, the modal teaching load in the first semester of AY 2001-2002 for those teaching advanced statistics courses is 1 to 6 units, while that for those teaching basic statistics courses is 19 to 24 units (Table 7). There are regions where the modal teaching load for those handling introductory statistics courses was in excess of 24 units: Regions 4, 6, 9 and CAR. These information together with the information obtained earlier that only 414 faculty were teaching predominantly statistics courses (Tabunda, 2007) suggests that many faculty members handling the basic statistics course are teaching these on top of their regular load in their main discipline, while those teaching the advanced statistics courses, particularly those in NCR, are serving on a part-time basis and may be safely presumed to have other employment. In either case, the data suggest that those teaching statistics courses, whether basic or advanced, are laden with work.

Table 7. Modal Teaching Load By Level and Region*

Region	Faculty Teaching					
	Only Basic Statistics			Higher and/or Basic Statistics		
	Total No. Teaching	Modal Teaching Load (in units)	% in Modal Class**	Total No. Teaching	Modal Teaching Load (in units)	% in Modal Class**
Philippines	**936**	**19 - 24**	**26.6**	**98**	**1 - 6**	**23.2**
Region 1	68	19 - 24	36.8	11	7 - 12	45.5
Region 2	47	19 - 24	34	5	19 - 24	60
Region 3	99	19 - 24	26.5	1	7 - 12	
Region 4	105	> 24	36.2	6	> 24	66.7
Region 5	79	13 - 18	32.5	8	1 - 6	50
Region 6	56	> 24	37.5	5	7 - 12,	40
					> 24	40
Region 7	47	19 - 24	38.3	7	13 - 18	57.1
Region 8	40	13 - 18	27.5	2	1 - 6 ,	50
					7 - 12	50
Region 9	11	> 24	45.5	0		
Region 10	19	13 - 18	26.3	2	7 - 12 ,	50
					> 24	50
Region 11	53	7 - 12,	24.5	9	13 - 18	44.4
		19 - 24	24.5			
Region 12	32	7 - 12 ,	25	6	1 - 6,	50
		19 - 24	25		13 - 18	50
NCR	221	19 - 24	29.3	30	1 - 6	27.6
CAR	46	19 - 24,	37.5	5	> 24	60
		> 24	37.5			
ARMM	1	13 - 18	100	1	1 - 6	100
Caraga	12	13 - 18	33.3	0		

* Excluding courses categorized as unclassifiable

** Based on complete data (i.e., those with reported values)

Source of raw data: CHED 2001 Survey of Faculty

IV. PROSPECTS FOR THE TEACHING OF STATISTICS IN THE COUNTRY

The primary data used to provide a profile of the faculty teaching courses in statistics is rather dated, having been obtained in 2001. But there are no indications that the profile would have improved since then. Enrollment in applied statistics and statistics degree programs grew at an average annual rate of 3.9% and 7.6%, respectively, for the period 1990 to 1998[5]. And it would have been reasonable to presume that these rates would have more or less obtained in succeeding years were it not for the structural break in enrollment figures for S&T degree programs that occurred in AY 2001–2002 as a result of increased global demand for nurses. Increased demand for nursing degree programs resulted in a decline in enrollment in AY 2003-2004 in, among others, mathematics and computer science, which includes statistics (Table 8).

Table 8. Enrollment Growth Rates, AY 1994-2003, S&T Discipline Groups and Selected Non-S&T Discipline Groups, in Percent*

	Average AY94-98	AY 99-00	AY 00-01	AY 01-02	AY 02-03	AY 03-04
Philippines	**5.1**	**4.1**	**2.4**	**1.4**	**-1.6**	**-0.3**
S&T DISCIPLINE GROUPS						
Agriculture, Forestry & Fishery	6.7	13.0	2.6	8.5	-10.8	-7.6
Architecture & Town Planning	2.0	-4.1	4.8	7.4	1.3	-13.1
Engineering & Technology	4.7	4.4	2.7	2.2	-6.0	-0.6
Mathematics & Computer Science	23.2	-0.4	7.3	10.6	3.5	-3.9
Medical & Allied Fields	-13.5	-3.4	-5.9	15.7	34.3	45.2
Natural Science	10.0	11.3	1.2	4.2	-6.8	-7.9
Nautical Science	n.a.	-1.4	-4.0	-5.8	-11.6	-4.7
NON-S&T DISCIPLINE GROUPS						
Business Administration	3.6	-0.4	2.1	-0.9	-3.6	-9.6
Education and Teacher Training	15.4	9.6	4.9	-6.3	-5.0	-3.2

* Reproduced from Tabunda (2007)
n.a. - not available
Source of basic data: CHED

However, demand for statistics education and training is a function not only of demand for statistics degree programs, but also of demand for most of the other S&T degree programs as well as some degree programs in management and the social sciences. Statistics, like mathematics, is more often offered as a service course. Thus, even if demand for statistics degree programs itself falls in the face of increased demand for other S&T programs, demand for introductory or even intermediate level statistics courses will not necessarily fall. Thus the shortage of qualified teachers in statistics may be expected to continue, if not worsen.

---

[5] Enrollment figures at the level of subdisciplines (statistics is considered as a subdiscipline of mathematics by CHED) were extracted from raw data provided by CHED for the years AY 94-95 to AY 97-98. The raw data was used to disaggregate AY 90-91 to AY 93-94 enrollment figures at the discipline level under the assumption that enrollment in the different subdisciplines occurred in the same proportions found for AY 94-95 to AY 97-98.

V. CONCLUSION

"What is to be done? What is needed is a combination of education and public relations. Both will be extremely difficult. Educational approaches cannot be limited to schools, polytechnics and universities – teaching t-tests to teenagers is no solution to our problems."

M. J. R. Healy

Although he was referring to the development of pattern recognition, artificial intelligence and fuzzy logic, among others, in the next quotation, the remark of Healy (1984) applies as well to the situation in our country where we find teachers without adequate statistics background teaching statistics: "*It is easy for statisticians to look down upon these as amateurish attempts to muscle in on our specialty. It is less easy to come to terms with the fact that such attempts are only made in response to problems felt left to be unsolved, and that they will be amateurish only if no professional solutions are effectively on offer.*"

What, specifically, is to be done? Professional statisticians in the country, through the Philippine Statistical Association, Inc. (PSA), the Statistical Research and Training Center (SRTC), statistics units in the academe, and other agencies in the Philippine statistical system, have been addressing this particular problem by offering various types of training and service courses that seek to upgrade statistical capability in the country. Yet demand for statistics education and training in the country continues to outpace supply of professional statisticians and at an accelerating rate at that.

Needless to say, all these efforts will have to be maintained if not augmented. The data indicate that one avenue that the PSA has been pursuing – that of improving locally published introductory statistics textbooks - may have to be pursued with more vigor. Most of the teachers handling statistics courses teach the introductory course. Many either have not taken a formal statistics course or are not qualified to teach at the tertiary level. It is thus not likely that they will detect errors in a textbook, no matter how gross. Ensuring that local introductory textbooks on statistics are of sufficiently good quality can help mitigate the problem.

Upgraded training for those teaching statistics courses will also have to be targeted. And here the focus need not be confined to those without adequate preparation in statistics. For as Healy (1984) puts it: ". . . *statistics, for all the uniformity of elementary textbooks, does not consist of a closed repertory of technical tricks, but rather that it is a live and growing discipline abounding in technical challenge and constantly finding new areas ripe for invasion.*" In the instances that it is taught right, is statistics being taught as such – alive and growing – or are students in other disciplines being subjected to "little more than a watered-down version of an introductory course in mathematical statistics" (McPherson, 1989), possibly even by some of our own colleagues?

Given the great need for education and training, an option that can be explored is that of offering professional development courses, via distance learning, that can target, among others, teachers of probability and statistics who do not have statistics degrees. Such courses will have to be developed, and handled, by no less than professional statisticians who have had considerable teaching experience.

The solutions are not easy, especially for a statistical community that is already hard pressed, by virtue of its small size, to meet the growing demands made upon it. But only the statistical community can hope to provide the solutions to this problem. And unless it rises to the challenge, it faces the prospect of a further limited pool of statisticians in the future.

Acknowledgement

The author thanks DOST-SEI for funding the UPSCRF research project which collected and prepared the data on which this paper is based. The author also thanks CHED particularly for the raw data on the 2001 survey on faculty, a valuable source of information on turn-of-the-century S&T teaching capability in the country. Special thanks go also to C. S. Labina, G. Z. Luna, C. R. D. Reyes, and J. T. Tejada, without whose research assistance the database would not have been completed, and an anonymous reviewer for the helpful comments on an earlier draft of this paper.

References

BERSALES, L. G. S. (2007). "Academic Programs in Statistics in the Philippines", *The Philippine Statistician*, this volume.

HEALY, M. J. R. (1984). "Prospects for the Future. Where has Statistics Failed?" *Journal of the Royal Statistical Society A,* 147 Part 2, 368-374.

LINDLEY, D. V. (1984). "Prospects for the Future. The Next 50 Years," *Journal of the Royal Statistical Society A,* 147 Part 2, 359-367.

MCPHERSON, G. (1989). "The Scientists' View of Statistics – a Neglected Area," *Journal of the Royal Statistical Society A,* 152 Part 2, 221-240.

TABUNDA, A. L. (2007). *Scientific and Technological Teaching Manpower Requirements in 2000 to 2010.* Metro Manila: DOST-SEI.

UNESCO. "A Survey of Statistics Teaching in Developing Countries". http://unesdoc.unesco.org/images/0000/000061/006114MB.pdf